INUNDATION PLAN FOR HURRICANE CATEGORIES II - IV

1. Background

a. Storm Surge. Storm surge is a water rise that is the combined result of an atmospheric low pressure area (in this case, a strong tropical cyclone) that causes a dome in the water surface, and other factors, such as the horizontal scale of the storm, the direction and speed of advance (SOA) of the storm, and the coastal geometry and bottom topography near the area of interest. As the storm moves toward land, the dome of water invades coastal areas. The problem is compounded by the large waves usually accompanying a strong tropical cyclone. The waves are driven across shoaling water by high winds, piling them on the shore. These steep, breaking waves are driven so hard by the wind that they create a general landward-flowing surface current that moves faster than the surplus water can return seaward along the bottom. The result is a flooded coast. **In the northern hemisphere the highest storm surge commonly occurs in the region of strongest winds to the right of the path of the tropical cyclone.**

b. Results of surge effects are presented in Table I.

NAVAL STATION NORFOLK

HURRICANE CATEGORY I		HURRICANE CATEGORY II		HURRICANE CATEGORY III		HURRICANE CATEGORY IV	
Storm Dir./ Speed	Surge (FT)*	Storm Dir./ Speed	Surge (FT)*	Storm Dir./ Speed	Surge (FT)*	Storm Dir./ Speed	Surge (FT)*
WNW/20	4.4	WNW/20	8.9	WNW/20	12.6	WNW/20	15.4
* All heights listed are above Mean Sea Level (MSL). Speed is storm speed not wind speed.							

c. The southern Chesapeake Bay region, including Hampton Roads, also experiences water level increases that occur as a result of strong, persistent northeasterly winds associated with extra tropical low-pressure systems that move northward along the east coast of the United States. The water rises are also referred to locally in the Norfolk area as storm surge. These storms, called "northeasters," may occur at any time, but are not common during the tropical cyclone season. According to NAVSTA Norfolk harbor authorities, northeasters can raise the water level at NAVSTA by as much as 9.4 ft. A rise of that magnitude is said to have occurred on Ash Wednesday in 1962, and is considered locally as a worst-case event for the northeaster phenomenon.

d. Naval Station Norfolk sits at an elevation of between 9.5 ft and 15.5 ft above sea level with the highest elevation being around the airfield. In the event of severe flooding caused by tides, storm surge, torrential rain and lack of runoff, most or even all of Naval Station Norfolk could be under several feet of water. Naval Station Norfolk could be totally

flooded for many days. Many factors affect the subsiding of flood water: decreasing tide, wind direction, geographical elevation, and drainage capabilities are all key elements for subsiding water time lines.

e. The impact of major flooding would be from severe to catastrophic. Operational readiness and the ability to function routinely would cease. Loss of utilities would occur. Electrical service to the base would be discontinued contingent upon Dominion Virginia Power's capabilities to continue to provide electrical service and the condition of the on-base electrical transmission infrastructure.

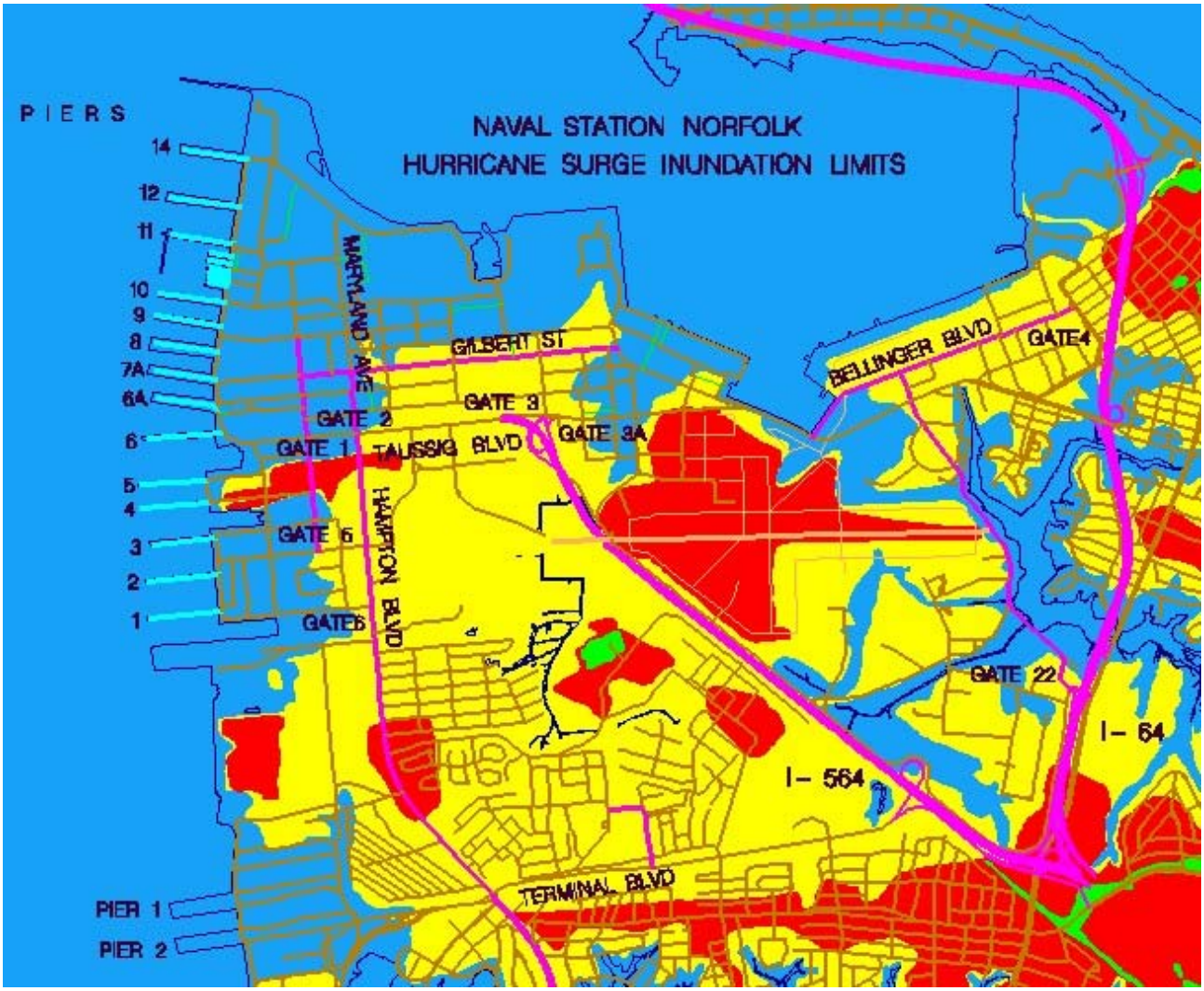
f. Potable water could be contaminated or not accessible for days depending on the status of the City of Norfolk's water purification system. **Potable water must be stored prior to the onset of destructive weather.**

g. Sanitation systems, including CHT for ships would not be operational, due to floodwaters infiltrating the pumping stations and sewage lines. Sewage would be one of the last utilities to be restored due to complexity and the vast areas involved. **Portable toilets must be available for all Alpha personnel before the storm and flooding occurs.**

h. Steam must be secured on the piers and in low-lying areas prior to onset of flooding. Steam will be very difficult to restore if piping and facilities are physically damaged.

i. Base communications, including landlines, cell phones, and some radios, could be inoperative. Transmission towers and fiber optic lines would be damaged thus hampering the ability to communicate. Coded cell phones issued prior to the event to key players would provide limited communication capability.

j. Due to flooding and storm damage to roads, bridges and tunnels throughout the region, Naval Station Norfolk could be entirely dependent upon itself to survive and restore operations for days prior to receiving external assistance.



HURRICANE CATEGORY

Category 2

Category 3

Category 4

Note: Storm surge data is referenced from the Virginia Hurricane Evacuation Study, published by the Virginia Department of Emergency Services, the Federal Emergency Management Agency, and the U.S. Army Corps of Engineers, April 1991.

This storm surge identifies the areas under water from STORM SURGE ONLY and does not include flooding caused by rain and lack of runoff.

2. Action

a. In the event of a major hurricane which will cause severe flooding, destructive winds and high storm surge the following plan will be implemented.

b. In Condition of Readiness (COR) III the Commanding Officer Naval Station Norfolk will call a meeting for all Dept. Heads, Special Assistants, Program Director Representatives and Officers In Charge reporting to CO Naval Station. This meeting will determine what actions will be taken to prepare Naval Station Norfolk for the converging storm.

c. Pier Securing and Damage

(1) To minimize damage, the Commanding Officer Naval Station Norfolk will direct the Public Works Officer to secure power to all piers prior to the onset of severe flooding. Power to the double deck piers can be left on longer, and will probably be last to be secured due to their height and construction. Ships unable to sortie must be prepared to provide their own electrical power. Other utility services, including water, sewage and phones will be secured as required to prevent system damage.

(2) Pier damage assessments will be made by Public Works Officer and Atlantic Division, Naval Facilities Engineering Command. Assessment results will be reviewed with the Commanding Officer and Port Operations Officer to include recommendations on pier closing & opening, utility service availability, and structural integrity.

d. Sheltering

(1) Only mission critical (Alpha) personnel will be sheltered in Naval Station shelters.

(2) Bldg. U-40 will not be used as a shelter in a CAT II storm or greater due to flooding that occurs to the rear of the Bldg. Bldg. O-26 located on Piersey Street near Bainbridge Street will be the primary shelter. Bldg. B-30 will be used as a back-up communication center in the event the Emergency Communication Center (ECC) and Regional Operations Center (ROC) are inoperable due to flooding. CO Naval Station Norfolk will relocate to Bldg. B-30 for operational command.

(3) Mission critical personnel who must stay in their work facility during destructive weather shall locate in their facility a minimum of 20 FT above sea level, be totally self sufficient for three days to include having stores, potable water (1 gal. per day per person), MREs, portable sanitation stations, and communications with Naval Station Norfolk, Disaster Operations Communication (OPCOM) Center at 322-2323, fax 444-0951, or cell 438-4257. All commands with shelter in place personnel shall inform the Naval Station OPCOM Center of

their location, number of personnel in the facility and a valid phone number. Place a sign in a window visible from the street that says "Bldg. Occupied". Sheltering in place should be the absolute last resort. Every effort should be made to have personnel report to the shelter at onset of high winds and have them return after the storm subsides. Access to the base following the storm may not be allowed for several days.

(4) Facilities In Harms Way. When directed by the Commanding Officer Naval Station Norfolk, any facility with personnel sheltering in place which is subject to severe flooding or direct impact from the storm surge shall be evacuated at the time of notification. Evacuating personnel will report to the Naval Station shelter. Once evacuated, the senior naval officer or civilian of the facility shall inform the Naval Station QD (322-2365/66/67) and OPCOM center (322-2323) that the facility is vacant and secured.

e. Shelter Management. Each shelter shall have a manager who will select team members to support the operation of the shelter. This will be the responsibility of the Combined Bachelor Housing Director. Special Operations Director will inspect each shelter for operational readiness.

f. Small Boats. The following boats are designated for hurricane support and shall be prepositioned at the location shown when Condition II is set.

(a) Fire Department: One RHIB, three small boats with motors, three flat and three V-bottom to Bldg. LP-20 and LP-24, Bldg. CA-486, two small boats with motors

(b) Harbor Patrol: One 33 FT Zodiac, Three 24 FT Monarchs and One 22 FT Boston Whaler to Bldg. LP-20 and LP-24

(c) Special Operations: One small boat with motor, two flat bottom boats to Bldg. B-30

(d) O-26 Shelter: Two small boats with motors, two V-bottom boats

(e) SSU: One 22 FT with motor (escort craft) to LP-20 and LP-24

g. Parking. The NEX parking lot behind the CD Bldg. is the main lot for government vehicle parking during a hurricane event. Additional parking may be provided at the Air Terminal Norfolk and LP aircraft hangers identified prior to the event of destructive weather. Hanger personnel will be designated to assist in the parking of vehicles. PWC heavy duty equipment will be taken to Bldg. LP-20 and LP-22. PWC cranes and large boom trucks will be parked to the south of Bldg. LP-2 with their mast and booms down, laying on the road surface. Structural fire apparatus will be parked inside LP-20 and LP-24. Fire Station Four equipment will relocate to the Naval Station Brig

area. Firefighting crash and rescue equipment will be relocated to the highest portions of the airfield. Personnel utilizing shelters will park their POV's in the shelter lots by O-26, B-30, N-26 and designated aircraft hangers.

h. Security. When directed by the Commanding Officer, the Naval Station Security Precinct Officer will secure all gates as the storm intensifies. Gate sentries will secure the gates and relocate and establish a security observation post in a safe location in the immediate proximity of the gate. Emergency vehicles will be off the streets when winds exceed 50 knots. As weather and safety permits, damage assessments will be made and recommendations to open specific gates, roads, and facilities will be forwarded to the Commanding Officer Naval Station Norfolk. Security of Naval Station shall be maintained at all times and when deemed safe, patrols and gate security will resume. Security will establish a watch in high security areas to preclude looting and security breeches. **Prior to the onset of destructive weather all departments shall secure or remove cash and high value items to a safe location.** The armory and K9 kennels will relocate to LP-24 to be housed by the PWC vehicle manager.

i. Equipment/Resources

(1) In the event of major damage, special equipment will be required i.e. heavy-duty equipment, road graders, loading and transport equipment, generators, light plants etc. These resources will be provided by CBU 411 which will be located in the parking lot east of Bldg. B-30. In the event of severe flooding they will be relocated to the runway and taxi areas. PWC and contractural resources will also provide heavy equipment as requested. Commander Navy Region Mid Atlantic (CNRMA) will coordinate additional resources and provide Installation Commanders resources and equipment as emergent needs dictate. Naval Station will provide recovery and restoration progress updates and request for additional specialized equipment as conditions require. Oceana Air Det Norfolk will liaison with the aviation community to obtain resources i.e. helicopters for supply and medical transport. Fixed wing aircraft will be obtained for transfer of personnel and heavy duty equipment. Naval Station Special Operations will keep a direct line of communication with the CNRMA Operations and Plans Dept. throughout the weather event. All reports of events, request for resources and required updates will be documented and maintained by the Director, Special Operations.

(2) CNRMA will activate the area Navy Emergency Preparedness Officer (NEPLO) and coordinate resources for the region. These resources will be distributed within the sub area according to critical needs. CNRMA Regional Operations Center (ROC) is located in Bldg. N-26. In the event of flooding the ROC will relocate to Bldg. B-30 second floor OPCOM.

j. Safety. Safety will be the utmost priority due to the unique consequences of severe weather. Downed electric wires, sink holes, flooding, street washouts, fallen trees, Bldg. debris will create an extreme hazardous situation. At no time will personal safety be jeopardized during the entire evolution of a weather event. All injuries will be reported through the chain of command and medical services will be sought immediately as required. Personnel will use extreme caution, work in teams, and have communication capabilities for assistance in the event of an emergency. All personnel should seek shelter when winds exceed 50 knots. Emergency response may not be available when winds exceed 50 knots.

k. Medical Emergencies. Personnel requiring medical services shall report directly to Bldg. CD-2 Branch Medical Clinic. In the event of severe flooding the CD-2 dispensary will relocate to Bldg. O-26 (FTC Bldg.) for the establishment of medical treatment facility. All personal injuries of serious nature shall be taken to the closest hospital or to Portsmouth Naval Hospital if time and weather conditions permit. If immediate first aid is required the shelter medical team will provide assistance until additional medical services can be rendered at the closest facility. If street flooding precludes regular vehicular access, vehicles which have a high chassis ground clearance i.e. fire apparatus, cargo trucks, heavy-duty equipment and cargo transport vehicles will be used to transport injured personnel.

l. Mortuary Issues

(1) As conditions permit the deceased shall be transported to Regional Medical Center Portsmouth.

(2) When destructive weather and conditions preclude travel an incident morgue site will be established by Regional Medical personnel. Remains will be recovered, body bagged and evacuated to the incident morgue for identification purposes and the safeguarding of personal effects. The Branch Medical Clinic will provide assistance in the operation and control of this temporary facility. If electrical service is available, refrigeration facilities may be used in the following Bldgs. as incident morgue sites:

(a) Bldg. CEP156 cold storage facility.

(b) Bldg. CEP 156 portable cooling and storage boxes (self contained).

(c) Trailers with thermo-king cooling units (request PWC or contractor to provide) may also be used if electrical service is unavailable.

(d) In the event of numerous fatalities, CNMRA Operations and Plans Department will be notified and requested to provide additional assistance from other commands within the SOPA ADMIN SUB-AREAS or within the Regional Planning Agent area of responsibility.

m. Damage Assessment. Immediately following a disaster as conditions permit, Naval Station CDO will perform initial inspections and report any emergent conditions to the ECC. The Disaster Preparedness Division Zone Teams will survey their designated zones reporting damage status to the Special Operations OPCOM Center via the LIMA Net. Damage assessment reports will be submitted through PWO for prioritization. Enclosure 4 (Initial Damage Assessment Report) of this instruction will be utilized for documenting and reporting of initial damage. All follow up damage assessments are the responsibility of Commander, Naval Facility Engineering Command. NAVFACENGCOM will coordinate the organization of damage assessment teams for the Sub Areas Regional Planning Agents (SRPAs), the preparation of damage assessment reports and the forwarding of reports to COMNAVREG MIDLANT. All damage reports should be forwarded by Special Operations to the NAVSTA CDO for inclusion in the SITREP to CNRMA.

n. Restoration Priorities

(1) Air field: Open air field to allow emergency transport of equipment and personnel.

(2) Electrical: Restore service to critical facilities such as medical clinic, galley, command center, airfield tower.

(3) Water & sewage: Depending upon the City of Norfolk's utility service.

(4) Shelter: Maintain safe environment for personnel until normal operations return and will remain open until closed by the Commanding Officer.

(5) Galley: Operate 24/7 to feed all personnel on station to include work teams, shelter personnel, residence, and operations.